

REMARKS

This paper is responsive to the Office Action dated May 25, 2005. Claims 21-55 were examined. Independent claims 21, 32, 42, and 45 were amended. New claims 56 – 58 have been added. Applicant submits that no new matter has been added. Applicant notes that the Examiner ignored arguments in previous responses made with respect to claims 22, 25, 28, 34, 37, 40, 42 – 44, 49, and 52. Applicant requests that the Examiner provide a complete and proper examination of the claims.

Rejections under 35 U.S.C. §102

Claims 21-55 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,168,564 issued to Barlow (hereinafter “Barlow”). Applicant traverses all rejections. To reject the claims, the Examiner relies heavily on inherency and supports the conclusions of inherency with factual assertions that are not supported by Barlow.

Independent claims 21, 32, and 45

The rejections disregard recitation of determining in the claims. According to the Examiner, the locking in Barlow can be characterized as speculative because a hazard may or may not exist. However, the reasoning by the Examiner to achieve speculative locking ignores the claim language. To aid the Examiner, Applicant has amended the independent claims 21, 32, and 45.

Claim 21 recites “speculatively locking a resource...prior to determining whether a hazard exists....based, at least in part, on order of the first instruction with respect to the second instruction.” Claim 32 recites “speculatively lock a resource...prior to determining whether a hazard exists...based, at least in part, on order of the first instruction with respect to the second instruction.” Claim 45 recites “means for locking the resource prior to determine whether a hazard exists based, at least in part, on order of the first instruction with respect to the second instruction.”

It should be clear to the Examiner that Barlow fails to disclose or suggest determining whether a hazard exists between instructions. As stated by the Examiner, hazards may or may

not exist. Applicant requests that the Examiner indicate where Barlow discloses or suggests determining whether a hazard exists based on order of instructions as asserted by the Examiner.

Independent claim 42 – Barlow fails to disclose or suggest speculative dispatch of a load operation

The Examiner ignored the arguments for independent claim 42 submitted in the previous response. The advisory action only addresses claims 21, 32, and 45. Claim 42 recites a “processor adapted to speculatively dispatch a load operation to a cache unit prior to determining whether read-after-write hazards associated with the load operation are present and adapted to handle a datum from the cache unit for the speculatively dispatched load operation based, at least in part, on the determining.” In rejecting claim 42, the Examiner states that a “lock indicator, or mechanism can be canceled after it is set once it is determined that the command using the resource that is locked is invalid, therefore the resource is being locked before the command has been determined to have hazards, and before the command is known to go until completion.” The Examiner also states that since Barlow has disclosed a read portion of a RMW operation, then Barlow discloses a load operation. The Examiner never addresses the actual limitations of claim 42. The Examiner has not identified any disclosure or suggestion for speculatively dispatching a load operation, and especially speculatively dispatching a load operation prior to determination of whether RAW hazards exist. As stated above, Barlow never discloses or suggests determining whether a hazard exists. In addition, Barlow fails to disclose or suggest handling a datum returned from the cache unit based on the determining.

Examiner assumes limitations without support from Barlow and improperly asserts inherency

Claims 22, 34, and 46

To maintain the rejections, the Examiner states that

a trap stage could be any stage within the processing of an instruction in which a fault is fixed. Clearly, if a resource is already locked, and it needs to be unlocked (column 9, lines 35 - 36), then the locking is performed before the error is fixed in a “trap stage”.

Column 9, lines 35 – 36 recite “[a]ssuming that the lock should have been reset and was instead set, a write lock reset command is issued.” Hence, the Examiner rejects these claims based on an assertion that a limitation of a trap stage means nothing to the Examiner. With this assertion, the Examiner effectively rewrites the claims. Applicant requests that the Examiner examine the pending claims as they are written, and that the Examiner either identify the section of Barlow that supports the assertion that a trap stage is at any time or identify the section of Barlow that discloses or suggests locking a resource prior to a first instruction entering a trap stage of a pipeline.

Claims 25, 37, and 49

The Examiner ignored arguments presented for claims 25, 37, and 49 in the previous reply. The Examiner relies on inherency to support rejection of claims 25, 37, and 49. In response to Applicant’s remarks, the Examiner states that

Clearly, before a resource is locked, its location/address must be determined. The process of determining which resource to lock and then locking it is part of an “effective address calculation stage” of the pipeline.

Since the Examiner cannot find support to reject the claims, the Examiner relies on an assertion of inherency. The Examiner states that locking must be performed during an effective address calculation stage. Applicant requests identification of the section of Barlow that discloses impossibility of locking subsequent to an effective address calculation stage, and the necessity of locking a resource during its effective address calculation stage.

Claims 28, 40, 44 and 52

Barlow does not disclose or suggest “unlocking the resource no later than a time at which the first instruction exits an instruction pipeline, regardless of whether the first instruction is cancelled” as recited in claim 28, and similarly in claims 40, 44, and 52. Again, the Examiner asserts that these limitations are inherent. The Examiner states that “if an instruction specifies unlocking, then unlocking is part of processing the instruction, and therefore, the unlocking will have to occur before the instruction leaves the pipeline (completes).” The Examiner has again examined only a portion of the claim limitations. The Examiner fails to address the entire claim,

which includes recitation of “regardless of whether the first instruction is cancelled.” Barlow fails to disclose or suggest the limitations of the claims, and the Applicant requests that the Examiner identify the section of Barlow that discloses or suggests the claims in their entirety and not just limitations selected by the Examiner.

Claim 43

Claim 43 recites “wherein the processor is adapted to lock a resource associated with the load operation concurrently with dispatching the load operation.” The rejection of claim 43 relies on the rationale that a “lock indicator, or mechanism can be canceled after it is set once it is determined that the command using the resource that is locked is invalid, therefore the resource is being locked before the command has been determined to have hazards, and before the command is known to go until completion.” Applicant cannot determine how this assertion by the Examiner relates to claim 43, since there are no assertions as to concurrency of locking and dispatch. Barlow does not disclose or suggest locking a resource to be accessed by a load operation concurrently with dispatch of the load operation. Moreover, the Examiner fails to address these limitations.

For at least the reasons above, Barlow does not anticipate any of Applicant’s claims.

Conclusion

In summary, claims 21 – 58 are in the case. All claims are believed to be allowable over the art of record, and a Notice of Allowance to that effect is respectfully solicited. Nonetheless, if any issues remain that could be more efficiently handled by telephone, the Examiner is requested to call the undersigned at the number listed below.

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that, on the date shown below, this correspondence is being

- ☒ deposited with the US Postal Service with sufficient postage as first class mail and addressed as shown above.
☐ facsimile transmitted to the US Patent and Trademark Office.

 26-Sep-2005
Steven R. Gilliam Date

EXPRESS MAIL LABEL: _____

Respectfully submitted,



Steven R. Gilliam, Reg. No. 51,734
Attorney for Applicant(s)
(512) 338-6320 (direct)
(512) 338-6300 (main)
(512) 338-6301 (fax)